Before the
Federal Communications Commission
Washington, D.C. 20554

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In the Matter of	)	
	)	
Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules	)	WT Docket No. 99-168
	)	
Auction of Licenses in the 747-762 and 777-792 MHz Bands Scheduled for May 10, 2000	)	DA 00-43/Report No. AUC-99-31-A

To: Chief, Wireless Telecommunications Bureau

COMMENTS OF U S WEST WIRELESS, LLC

U S WEST Wireless, LLC ("U S WEST"), hereby responds to the Wireless Telecommunications Bureau's ("Bureau") request for comments on proposed auction rules for licenses in the 747-762 and 777-792 MHz bands.[1] As discussed herein, the Bureau's proposed minimum opening bid amounts have failed to account for the overly stringent limitations adopted in the *First Report and Order* on out-of-band emissions ("OOBE") and permissible transmit power limits.[2] Utilizing the congressional valuation of this spectrum is therefore inappropriate.

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[1] Public Notice, *Auction of Licenses in the 747-762 and 777-792 MHz Bands Scheduled for May 10, 2000*, DA 00-43 (rel. Jan. 10, 2000), 65 Fed. Reg. 2956 (Jan. 19, 2000) ("Public Notice").

[2] *Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, *First Report and Order*, WT Docket No. 99-168, FCC 00-5 (released Jan. 7, 2000), 65 Fed. Reg. 3139 (Jan. 20, 2000) ("*First Report and Order*").

DISCUSSION

The record in this proceeding shows that the stringent OOBE limits may significantly inhibit commercial licensees' ability to provide viable services using existing IS-95 or future wideband CDMA technologies.[3] As discussed in U S WEST's December 21, 1999 *ex parte* presentation submitted in response to filings submitted by Motorola, it appears that based on information provided by one manufacturer's equipment, spectral requirements significantly more stringent than -40 dBm at the edge of the public-safety band could significantly reduce the utility of the commercial radio spectrum for current and future CDMA-based technologies.[4] Furthermore, the transmit power limits may unnecessarily preclude the deployment of time division duplex ("TDD") technologies.[5] These technical requirements will render this spectrum substantially less attractive to many wireless carriers for commercial use and therefore less valuable at auction.

The OOBE and transmit power limits call into question the validity of the Bureau's proposed minimum opening bids for these licenses which, in turn, are based on

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[3] Section 27.53 of the rules requires an OOBE limit for commercial licensees' base stations in the 747-762 and 777-792 MHz bands attenuated outside the band by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment on all public safety frequencies between 764-776 MHz and 794-806 MHz. Mobiles operating in the commercial 777-792 MHz band must be attenuated by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment on all public safety frequencies between 764-776 MHz and 794-806 MHz. 47 C.F.R. § 27.53.

[4] U S WEST, *Ex Parte* Presentation in WT Docket No. 99-168, filed December 21, 1999, at Attachment (copy attached); *see also* Bell Atlantic, *Ex Parte* Presentation, filed Dec. 9, 1999, at 3 (providing comments from Lucent).

[5] Section 27.50 of the Commission's rules requires (in relevant part) that: (1) commercial fixed and base stations at 747-762 MHz not exceed an effective radiated power (ERP) of 1000 watts, (2) fixed, control, and mobile stations transmitting in the 777-792 MHz band are limited to 30 watts ERP; and (3) portable stations (hand-held devices) transmitting in the 777-792 MHz band are limited to 3 watts ERP. 47 C.F.R. § 27.50.

Congress's valuation of the spectrum.[6] While CBO discounted the value of the spectrum to account for commercial licensees' need to accommodate incumbent broadcast licensees,[7] it is not likely that Congress anticipated that the Commission would adopt measures so stringent as to significantly inhibit potential bidders' technology options for this spectrum.[8]

In short, the Bureau's use of Congress's valuation of the spectrum as a "proxy" fails to account for the *further* discount in the value of the spectrum resulting from the Commission's OOBE and transmit power limits. Unless the Commission revises these technical requirements prior to the auction, the base value of each license should be deemed considerably lower than Congress' valuation.

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[6] *See* Auction Public Notice at 6. Prior to Congress's expediting the auction schedule, P.L. 106-113, 113 Stat. 1501 (1999), the Congressional Budget Office (CBO) estimated that the auction of this commercial spectrum would generate $2.1 billion in 2001 and 2002. *See* Congressional Budget Office, CBO Memorandum, *Budgetary Implications of the Balanced Budget Act of 1997*, at 15 (Dec. 1997). Congress' more recent estimate is $2.6 billion.

[7] *Id.*

[8] CDMA is the fastest-growing wireless digital air interface protocol, and it is anticipated that wideband CDMA technologies in development will be widely deployed for third generation wireless ("3G") applications.

CONCLUSION

For the foregoing reasons, the Bureau's minimum opening bid amounts should be discounted further to reflect the impact of the Commission's technical rules on the value of this spectrum.

Respectfully submitted,

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January 24, 2000

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December 21, 1999

Magalie Roman Salas, Secretary
Federal Communications Commission
445 Twelfth Street, S.W., TW-A325
Washington, D.C. 20554

Re: *Ex Parte Notification in CC Docket No. 99-168 -- Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*

Dear Ms. Salas:

Pursuant to Section 1.1206(b) of the Commission's rules, 47 C.F.R. § 1.1206(b), this letter serves as notification that on December 20, 1999, Charles Cook, Wayne Leuck, Scott Bundy, Kathleen Abernathy and Robert Morse (representing U S WEST, Inc.), had a phone discussion with Marty Liebman and Ron Netro (of the Wireless Telecommunications Bureau) to discuss issues concerning the above-captioned proceeding. The purpose of the discussion was to address U S WEST's concerns regarding proposals recently submitted by Motorola in this proceeding intended to protect public safety licensees in adjacent spectrum from harmful interference. An overview of U S WEST's preliminary analysis of Motorola's proposal is attached hereto.

As demonstrated in the attached materials, Motorola's proposed adjacent channel protection standards could adversely affect commercial licensees' ability to utilize spectrum won at auction. Indeed, it appears that, under Motorola's proposal, existing IS-95-based CDMA systems may not be viable in the 700 MHz band. In today's discussion, U S WEST noted that, as a threshold matter, Motorola's data is premised on hypothetical scenarios: it is unknown what technologies public safety licensees will use in the spectrum adjacent to the 746-764 MHz and the 776-794 MHz bands, and it is unknown which commercial licensees will be using the spectrum, and what technologies they will utilize.

U S WEST further suggested that the existing Part 27 rules, which authorize the Commission to "at its discretion, require greater attenuation than specified in" the rules, provides sufficient protection for public safety licensees in the adjacent spectrum while affording commercial licensees sufficient flexibility, and that where instances of harmful interference to public safety licensees occur, the Commission would have sufficient authority to require greater attenuation on the part of the commercial licensee.[1] Bureau staff instead stated their preference for preventing harmful interference between commercial and public safety licensees through equipment type acceptance requirements, rather than on licensee-licensee coordination. As an alternative, U S WEST suggested that the Commission state in its upcoming *Report and Order* in this proceeding that it will consider waivers of such type acceptance requirements, to which Bureau staff indicated the Commission's traditional reluctance to waiving its equipment authorization rules.

U S WEST is greatly concerned that adopting Motorola's proposal -- particularly if implemented through equipment type acceptance requirements -- will significantly limit wireless carriers' available capacity, thus adversely affecting their ability to provide viable wireless services using existing IS-95 CDMA technologies. As mentioned in yesterday's discussion, the impact of such restrictions on carriers' deployment of wideband CDMA technologies to be used for third generation ("3G") wireless services could be even more acute. U S WEST believes that this approach, as opposed to the approach adopted in the *Notice of Proposed Rulemaking* in this proceeding,[2] will severely limit commercial licensees' ability to utilize the spectrum, thus devaluing the spectrum at auction. Indeed, a type acceptance approach

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[1] *See* 47 C.F.R. § 27.53(c); *see also id.* § 24.238 (broadband PCS).

[2] *Notice of Proposed Rulemaking*, WT Docket No. 99-168, FCC 99-97, ¶ 69 (rel. June 3, 1999) (proposing "attenuat[ion] of power below the transmitter power (P) by at least 43 +10 $\log_{10}$(P) watts or 80 decibels, whichever is less, for any emission on all frequencies outside the licensee's authorized spectrum" on basis "that this attenuation is commonly employed in other services and that it has been found adequate to prevent adjacent channel interference as a general matter"); *see also Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium, Policy Statement*, FCC 99-354, ¶ 9 (rel. Nov. 22, 1999) ("[a]nother way to allow flexibility in use of the spectrum is to allow licensees to negotiate among themselves arrangements for avoiding interference rather than apply mandatory technical rules to control interference").

may have the effect of precluding licensees who utilize a particular technology from bidding for the spectrum in the first instance.

While U S WEST believes that the Commission's current flexible Part 27 approach to adjacent channel interference provides adequate protection for public safety licensees, the spectrum at issue is simply too valuable to risk precluding commercial mobile use until Motorola's proposal has been more thoroughly scrutinized by potential auction participants and other interested parties. Therefore, before the Commission departs from the policy proposed in the *NPRM* and adopts what may be an unnecessarily stringent standard for adjacent channel interference, it should defer consideration of the technical specifications for adjacent channel interference and convene a technical workshop early in 2000 to address these issues.[3] The workshop could include representatives from service providers, manufacturers, and public safety and should provide an opportunity to discuss appropriate means of preventing harmful interference between commercial and public safety licensees. This will ensure that Motorola's proposal, as well as the analyses of that proposal by U S WEST and others, are more publicly vetted in advance of the auction.

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[3]This approach parallels the Commission's approach to E-911 Phase II testing guidelines, wherein OET and the Wireless Telecommunications Bureau were delegated authority to develop separate guidelines for testing. *See Third Report and Order*, CC Docket No. 94-102, FCC 99-245, ¶ 85 (rel. Oct. 6, 1999), Public Notice, *Information Sought on Methods for Verifying Compliance With E911 Accuracy Standards*, ET Docket No. 99-300, DA 99-2130 (rel. Oct. 8, 1999).

Please contact us should you have questions concerning the foregoing.

Sincerely,

WILKINSON BARKER KNAUER, LLP

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Attachment

cc: Ari Fitzgerald
Adam Krinsky
Marty Liebman
Kris Monteith
Ron Netro
James Schlicting
Mark Schneider
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Bryan Tramont
Stan Wiggins

ATTACHMENT

U S WEST WIRELESS, LLC
EX PARTE PRESENTATION
DECEMBER 21, 1999

PRELIMINARY ANALYSIS OF MOTOROLA PROPOSAL

Following is a brief analysis of Motorola's proposal for adjacent channel interference protection between commercial and public safety licensees in the 700 MHz band, WT Docket No. 99-168. This analysis is necessarily preliminary, given the time constraints imposed on U S WEST's review of the Motorola proposal. Nevertheless, it underscores the potential adverse impact of Motorola's potentially overly stringent requirements on commercial use of the 746-764 MHz and 776-794 MHz bands.

Approach

The information contained herein is based on two plots generated by Ericsson which was used in the preparation of TSB-PN-3777 (TSB-84 draft), "Licensed PCS to PCS Interference", by TR46.2. These two plots indicated the spectral characteristics of a typical IS-95-compliant CDMA base station and mobile station. U S WEST's simple analysis was performed as follows: first, the power levels at various offsets from the carrier frequency, or the center of the spread-spectrum signal, were tabulated; next, three simple conversions were applied to create the plots.

The first conversion was performed to re-scale the plots from the channel power used to generate the plots (43.8 dBm for the base station and 23.2 dBm for the handset) to the power levels that may be of interest. Transmit power levels of 10 Watts for the base station and 0.2 Watts for the mobile station were selected. A second conversion was necessary to convert the measured data from the 100-kHz resolution bandwidth used to collect the data to the 6.25-kHz bandwidth in which Motorola is interested. The third conversion was a simple frequency offset to plot the power level from the band edge. It was assumed that the center of the CDMA carrier would be placed in the center of the 1.25-MHz band directly next to the guard band, and hence 625 kHz from the center of the CDMA carrier will be referred to herein as the band edge.

Results

The first and most important result is shown in Figure 1. In this plot, the power radiated in a 6.25-kHz bandwidth is plotted as a function of the offset from the band edge as defined above. Typical plots are shown for both a 10-W base station and a 0.2-W mobile station.

There are three very important points to bear in mind when considering these plots. First, these correspond to a 1.25-MHz IS-95 CDMA signal, and as such are only valid for a signal with a similar bandwidth. It is expected that the out-of-band spurious emissions would generally increase with the utilization of a wider-bandwidth signal. Second, these plots are based on measured characteristics for a 20-W base station and a 0.2-W mobile station. As discussed in the previous section, a 3-dB shift was applied to

the 20-W base-station data to estimate the characteristics of a 10-W base station. Such a translation will incur some error. By reducing the power, the spectral re-growth due to third-order intermodulation within approximately one channel width of the band edge may actually decrease. However, some of the spurious emissions farther away from the band edge may not decrease by a full 3-dB due to the decrease in power. Therefore, it is believed that the error bars for the base-station plot are approximately +3 dB / -6 dB. Third, this data is based on a pair of plots measured by Ericsson. Even other IS-95-compliant CDMA equipment may have different spectral characteristics while still meeting the IS-95 specifications.

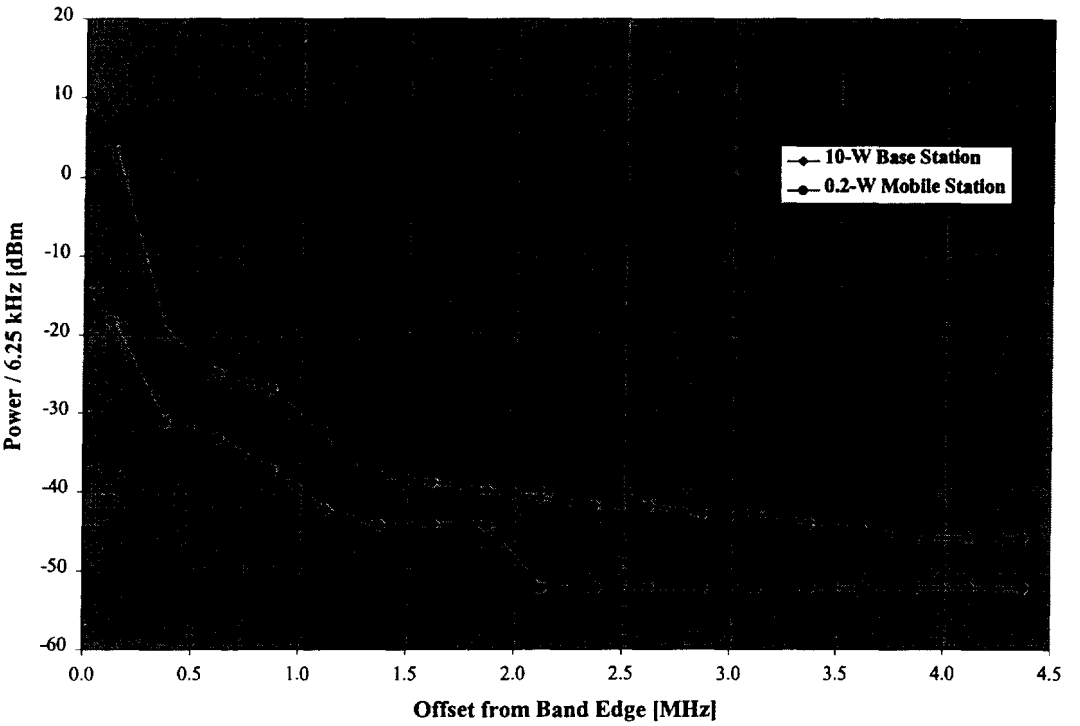

Figure 1. The spurious power radiated into a 6.25-kHz channel bandwidth plotted as a function of the offset from the band edge for both a 10-W base station and a 0.2-W mobile station.

If such equipment were placed at the edge of the commercial radio spectrum next to one of the 1.5-MHz guard bands, it is seen from the plot that the spurious emissions observed in a 6.25-kHz bandwidth would be –39 dBm and –44 dBm for the base station and mobile station, respectively. Such results indicate that spectral requirements that are more stringent than on the order of –40 dBm at the edge of the public-safety band could significantly reduce the utility of the commercial radio spectrum. Based on these plots, a –50-dBm specification would require over 2 MHz of guard band, and would limit the base-station transmit power to a level on the order of 1 W, even if the out-of-band emissions scaled directly with the channel power.

Figure 2 shows an attenuation plot based on the same spectral characteristics. In this figure, the ratio of the total power in the 1.25-MHz channel to the spurious power radiated in a 6.25-kHz bandwidth is plotted as a function of the offset from the band edge

as defined earlier. Note that at 1.5 MHz from the band edge, the base station and mobile station exhibit approximately 78 dBc and 67 dBc of attenuation, respectively. That is, the spurious emissions in a 6.25-kHz bandwidth are expected to be this far below the total transmit power in the 1.25-MHz channel. Again, these plots are only accurate for the 20-W base station and 0.2-W mobile station used to derive the spectrum analyzer plots. Some error will be incurred by extrapolating this to other power levels or other manufacturer's equipment.

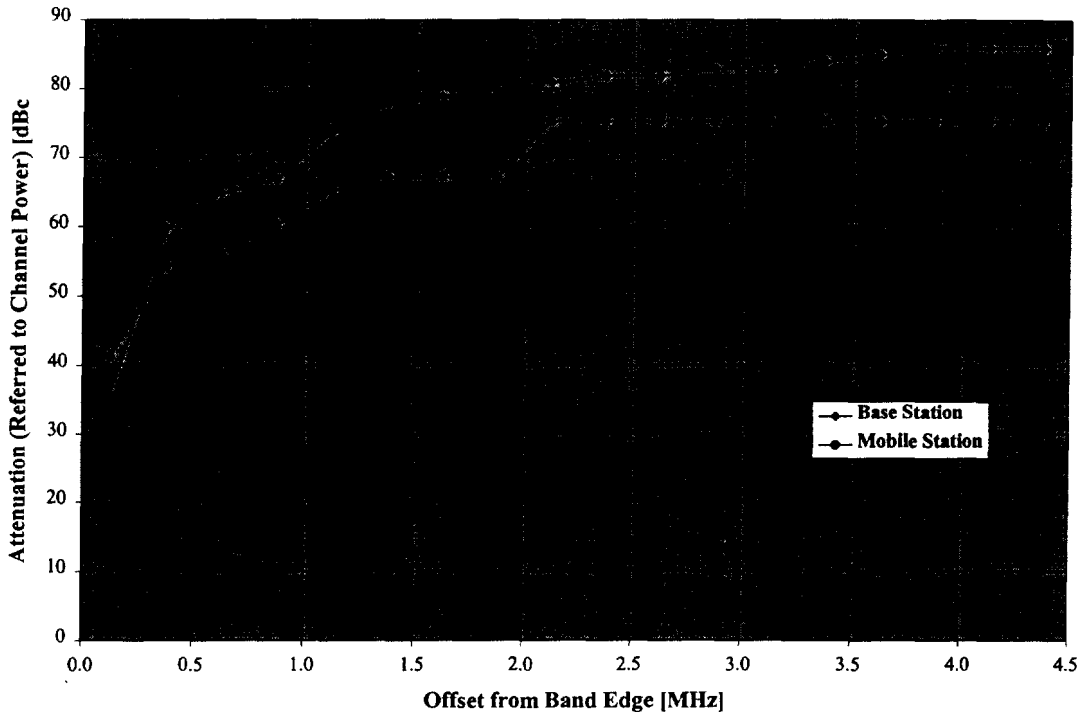

Figure 2. The ratio of the aggregate 1.25-MHz channel power to the spurious power radiated in a 6.25-kHz bandwidth plotted as a function of the offset from band edge for both base and mobile stations.

Caveats

As stated earlier, there are three important limitations to this preliminary analysis. First, this analysis is based on a 1.25-MHz IS-95 compliant CDMA signal. If a wider-bandwidth signal is used, as in a 3G-based system, it is expected that the spectral re-growth will be significantly worse than in an IS-95 system. Third-order intermodulation, which is typically the most significant, will generate spurious emissions up to about one channel bandwidth from the band edge. For a W-CDMA system, this is considerably past the 1.5-MHz guard band.

Second, this analysis is based on a 20-W base-station spectral measurement. Generally, a reduction in transmit power will reduce the intermodulation effects, and hence the spectral re-growth, but may not necessary reduce the out-of-band emissions further from the band edge. For a 1.25-MHz channel, the reduction in spurious emissions at 1.5 MHz may actually be less than the transmit-power reduction. For a wider

bandwidth signal, the spectral re-growth due to intermodulation may dominate, and therefore a reduction in transmit power may in fact provide more benefit 1.5 MHz from the band edge.

Third, it should be noted once again that this entire analysis is based on the Ericsson equipment used to generate the measured plots.